MARANDA HIGH SCHOOL

MOCK EXAMINATIONS – JULY 2019

121/1 **MATHEMATICS** **Paper 1**

Alt. A

July 2019 – 2½ hours

Name: ..... **AdmNo**: ..... **Stream**: .....

Date.....**Signature**: .....

Instructions to candidates

(a) Write your name, admission number and stream in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided above.
*(c) This paper consists of **two** sections: **Section I** and **Section II.***
*(d) Answer **all** the questions in **Section I** and only **five** questions from **Section II**.*
*(e) **Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.***
(f) Marks may be given for correct working even if the answer is wrong.
*(g) **Non-programmable** silent electronic calculators **and** KNEC Mathematical tables may be used, except where stated otherwise.*
*(h) **This paper consists of 15 printed pages.***
*(i) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
*(j) Candidates should answer the questions in **English***

For Examiner's Use Only

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

Section II

17	18	19	20	21	22	23	24	Total

Grand Total

SECTIONI (50 marks)

*Answer **all** the questions in this section in the spaces provided.*

1. Simplify the algebraic expression -2$\left[-x-2a-(a-x)\right]$. (2 marks)

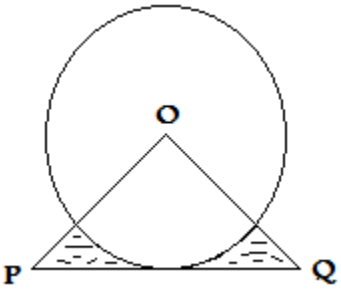
2. The attendance at a party consisted of 35 men, a number of women and some children. The number of women was one and a half times that of the children present.If there were a total of 65 participants calculate the number of children who attended the party. (3 marks)

3. Evaluate $\dfrac{\left(\frac{2}{3}-1\frac{1}{4}+\frac{5}{6}\right)}{\frac{2}{3}\ of\ 2\frac{1}{4}-1\frac{1}{7}}$ (3 marks)

4. The average lap time for three athletes in a long distance race is 36 seconds, 40 seconds and 48 seconds respectively. If they all start the race at the same time and point find the number of times the fastest runner will have overlapped the slowest runner at the time they all cross the starting point at the same time again. (3 marks)

5. The figure below show a circle of centre O. The line PQ=21cm is the tangent to the circle such that OP=OQ and obtuse angle POQ=140°. Calculate the area of the shaded region to two decimal places. Take $\pi=\frac{22}{7}$.

(4 marks)



6. Form the quadratic equation whose roots are x = $-\frac{5}{3}$ and x = 1 in the form $ax^2+bx+c=0$ where a, b and c are integers. (3 marks)

7. A business woman bought 300 oranges at Sh. 10 for every twelve oranges. Twelve of them got bad but she sold the remaining at Ksh.20 for every 18 oranges. Calculate the percentage profit. (3 marks)

8. Use square roots, reciprocals and square tables to evaluate to 4 significant figures. (4 marks)

$$(0.06458)^{\frac{1}{3}} + \left(\frac{2}{0.4327}\right)^2$$

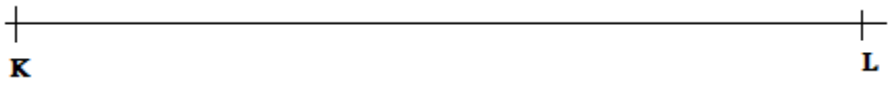
9. A straight line whose equation is 4y + 3x = 12 is perpendicular to line QR and cuts the x and y axes at P and Q respectively. Determine the acute angle α°, to one decimal place, which line QR makes with x-axis.
(3 marks)

10. Given that $\log_2 3 = 1.585$ evaluate $\log_2\left(\frac{36\sqrt{108}}{27}\right)$
(4marks)

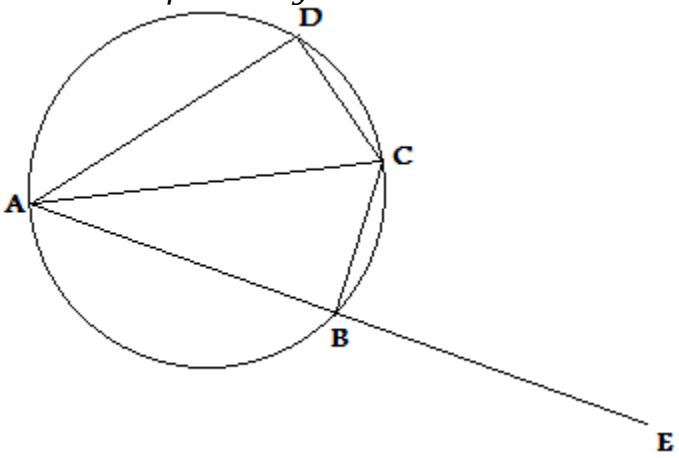
11. Given that x is an acute angle and $\sin(x-20)° = \cos(3x-50)°$ find the value of x in degrees.
(2 marks)

12. Determine the equation of the curve whose gradient at any point is given by 2x – 1. Given that the curve passes through point T(1, 5).
(3 marks)

13. A point Y is located along the line KL below such that KY:YL=$3:2$. Locate by construction the position of Y on line KL hence measure the length YL. (3 marks)

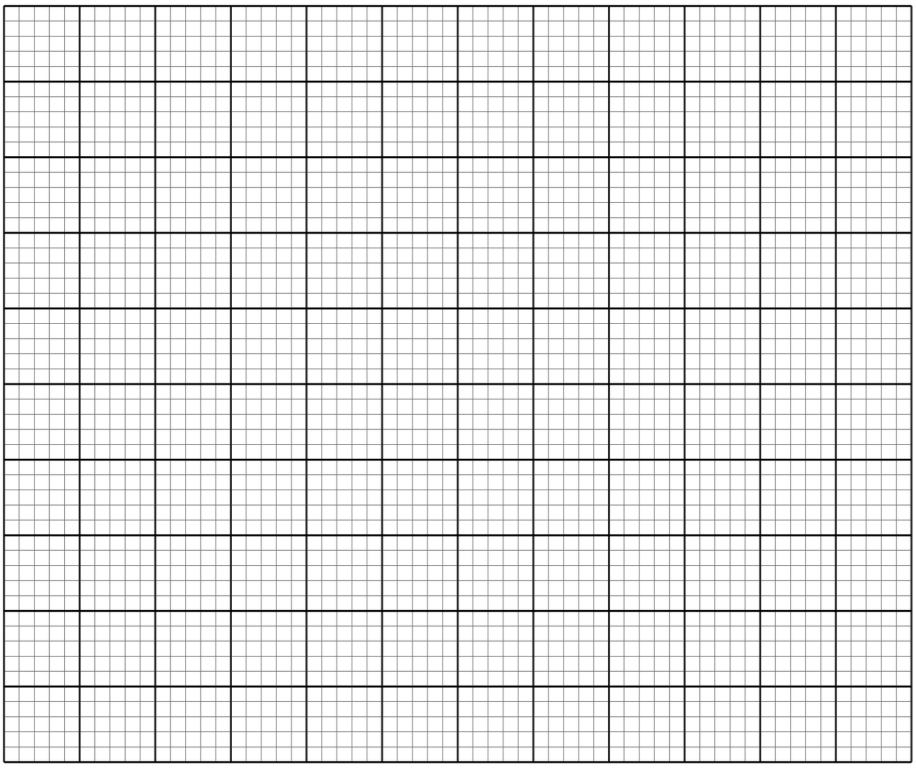


14. In the figure below, ABCD is acyclic quadrilateral. Angle DAC, angle ACB and angle CBE are $35°, 60° \wedge 95°$ *respectively*.



Determine the size of angle DAB.
(3 marks)

15. On the grid provided plot the inequalities $y-2x\leq 1$, $x+y<7 \wedge y\geq 1$ hence calculate the area of region R bounded by them.
(4 marks)



16. Use the trapezium rule to estimate the area under the curve y $=x^2+x-6$ over the interval 0≤ x≤8 using 8 trapezia.
(3 marks)

SECTIONII (50 marks)

*Answer any **five** questions from this section in the spaces provided*

17. Three tents A, B and C pitched on a flat field in an army camp are such that tent B is on a bearing of 135° and 1.5km from A and C is 2.7km away on a bearing of 215° from B.

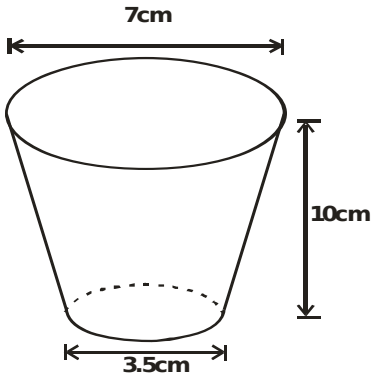
a) Using a scale of 1:30000 show relative positions of tents A, B and C on the space provided.
(3 marks)

b) State the bearing and the distance of tent C from A. (2 marks)

c) Locate the position of the watch tower, R, which is constructed such that all the tents are equidistant from it and determine its distance from tent A using AC and BC. (3 marks)

d) Another tent D is to be erected such that it is closer to B than A, but within the range of 2.4km from C and strictly within the straight paths linking the tents. Shade the possible region it is pitched.
(2 marks)

18. The figure below shows a glass in form of a frustum of a cone whose top and bottom diameters of 7cm and 3.5cm respectively. Its depth is 10cm. Taking $\pi = \frac{22}{7}$;



a) Calculate its total surface area to two decimal places.
(6marks)

b) A spherical metallic ball of radius 4.5cm is dipped into the glass. Calculate the volume of water, to two decimal places, which overflowed given that the height of water in the glass initially was 8cm.
(4 marks)

19. Two friends Jane and Tom live 40km apart. One day Jane left her house at 9.00am and cycled towards Tom's house at an average speed of 15km/hr. Tom left at 10.30am on the same day and cycled towards Jane's house at an average speed of 25km/hr.

a) Determine;

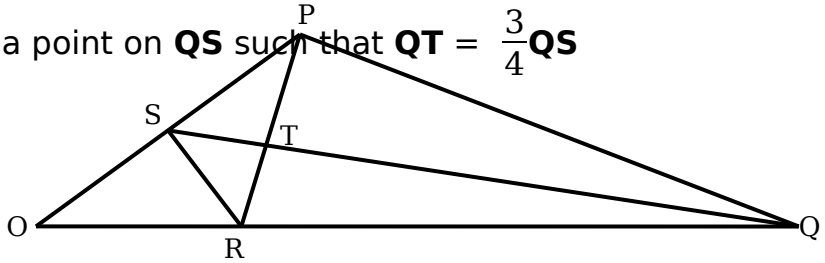
i) the distance from Jane's house, where the two friends met. (4 marks)

ii) the time they met. (2 marks)

iii) the distance Jane was from Tom's house when they met. (1 mark)

b) The two friends took 10 minutes at the meeting point and they cycled to Tom's house at an average speed of 12km/hr. Find the time they arrived at Tom's house. (3 marks)

20. The figure below shows triangle OPQ in which **OS** = $\frac{1}{3}$**OP** and **OR** = $\frac{1}{3}$ **OQ**. T is a point on **QS** such that **QT** = $\frac{3}{4}$**QS**



a) Given that **OP** = **p** and **OQ** = **q**, express the following vectors in terms of **p** and **q**.

i) SR (1 mark)

ii) **QS** (2 marks)

iii) **PT** (2 marks)

iv) **TR** (2 marks)

b) Hence or otherwise show that the points P, T and R are collinear. (3 marks)

21. Madam Beatrice used to buy a certain number of bottles of soda for her class during bashes for Ksh.3000. However when the prices of each bottle of soda went up by Ksh.10 she had to add money for ten more bottles on top of their usual budget.

a) Taking x as the original number of bottles of soda bought from the original budget, write an expression for the:
   i) Price of a bottle of soda before the increase in price. (1 mark)

   ii) Price of a bottle of soda after the increase in price. (1 mark)

b) Calculate:
   i) The number of students in Madam Beatrice's class given that each learner was entitled to two bottles of soda during the bash. (4 marks)

ii) The percentage increase in the price of a bottle of soda. (3 marks)

iii) The simplest ratio of the old price to the new price. (1 mark)

22. The equation of a curve is given by $y=6x^2-12x-18$.

a) Determine:

i) The equation of the tangent to the curve at the point where $x=2$ in the form $ax+by=c$.

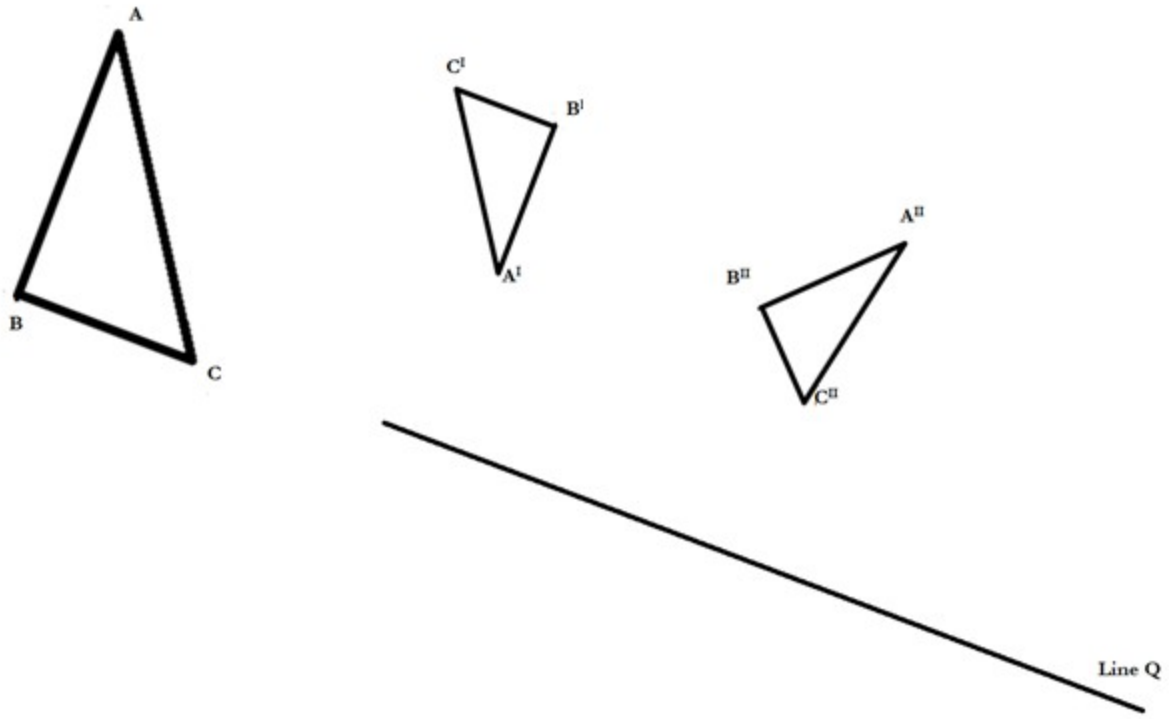
(3 marks)

ii) The turning point of the curve and classify it. (3 marks)

iii) The x-intercept and y –intercept. (2 marks)

(b) Sketch the curve showing clearly the turning points and the intercepts. (2 marks)

23. The triangle $A^{I}B^{I}C^{I}$ is the image of triangle ABC under a transformation enlargement of centre X and scale factor P. On the other hand $A^{II}B^{II}C^{I\,I}$ is the image of $A^{I}B^{I}C^{I}$ under rotation whose centre of rotation is Y and angle of rotation is α°. $A^{II}B^{II}C^{I\,I}$ is further reflected on line Q to give triangle $A^{III}B^{III}C^{III}$.



By construction:

a) Locate centre X hence calculate, to one decimal place, the scale factor of enlargement P. (4 marks)

b) Locate centre Y hence measure the angle of rotation α°. (3 marks)

c) Draw $A^{III}B^{III}C^{III}$ the image of $A^{II}B^{II}C^{II}$ under reflection on line Q. (3 marks)

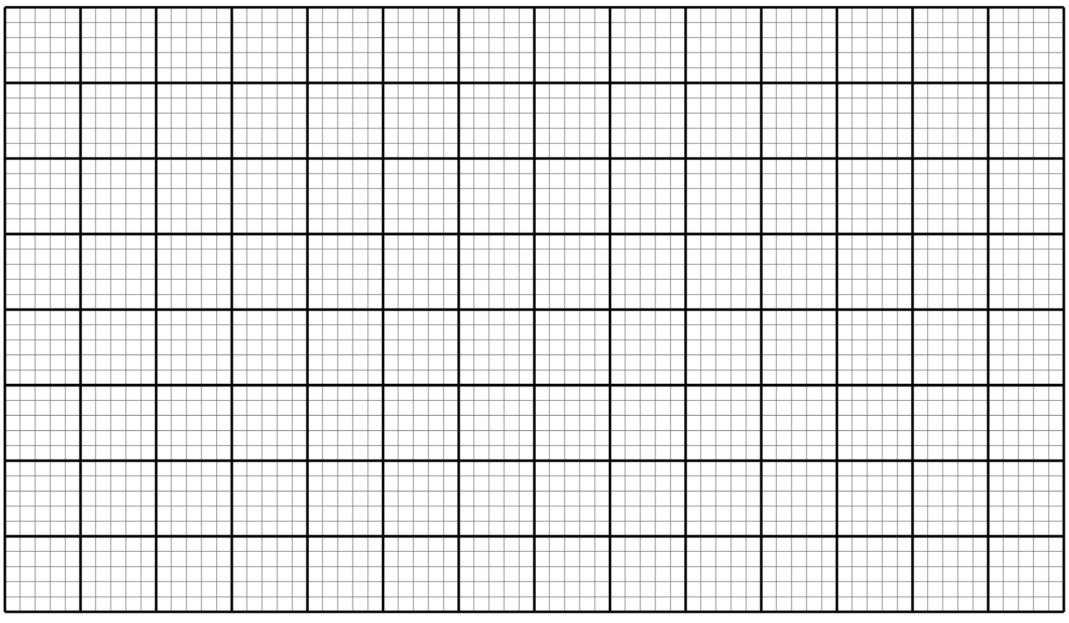
24. The data below is a daily record of sugar sold in one of the supermarkets in Kisumu town which sells any proportion in kilograms.

Mass of sugar	$0.5-0.9$	$1.0-1.4$	$1.5-1.9$	$2.0-2.4$	$2.5-2.9$	$3.0-3.4$
Number of people	22	38	14	12	10	4

a) Determine the total number of people who bought sugar from this supermarket on that day
(1 mark)

b) Calculate mean mass of the sugar bought from the supermarket in that day. (4 marks)

c) On the grid provided draw a histogram of the representation of the mass of sugar sold on that particular day.
(2 marks)

d)  Estimate the median mass of the sugar sold in the supermarket on that day hence draw a vertical line on the histogram locating the median mass. (3 marks)

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